* 0020747417501 *

Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

MATHEMATICS **0580/22**

Paper 2 Non-calculator (Extended) **May/June 2025**

2 hours

You must answer on the question paper.

You will need: Geometrical instruments

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- Calculators must **not** be used in this paper.
- You may use tracing paper.
- You must show all necessary working clearly.

INFORMATION

- The total mark for this paper is 100.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **20** pages. Any blank pages are indicated.

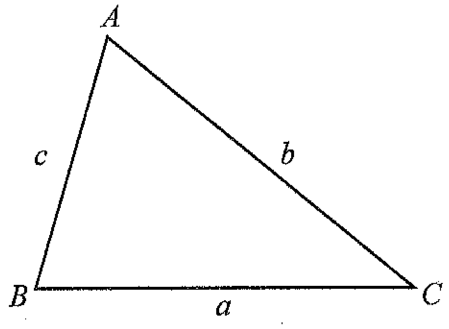
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List of formulas

Area, A, of triangle, base b, height h.	$A = \frac{1}{2}bh$
Area, A, of circle of radius r.	$A = \pi r^2$
Circumference, C, of circle of radius r.	$C = 2\pi r$
Curved surface area, A, of cylinder of radius r, height h.	$A = 2\pi rh$
Curved surface area, A, of cone of radius r, sloping edge l.	$A = \pi rl$
Surface area, A, of sphere of radius r.	$A = 4\pi r^2$
Volume, V, of prism, cross-sectional area A, length l.	$V = Al$
Volume, V, of pyramid, base area A, height h.	$V = \frac{1}{3}Ah$
Volume, V, of cylinder of radius r, height h.	$V = \pi r^2 h$
Volume, V, of cone of radius r, height h.	$V = \frac{1}{3}\pi r^2 h$
Volume, V, of sphere of radius r.	$V = \frac{4}{3}\pi r^3$

For the equation $ax^2 + bx + c = 0$, where $a \neq 0$, $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

For the triangle shown,



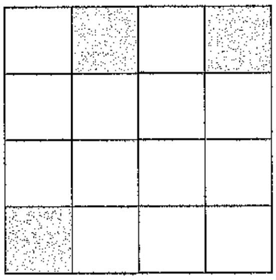
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc\cos A$$

$$\text{Area} = \frac{1}{2}ab\sin C$$

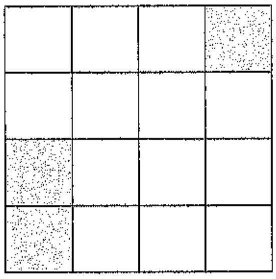
Calculators must **not** be used in this paper.

1 (a)



Shade **one** more small square so that the diagram has one line of symmetry. [1]

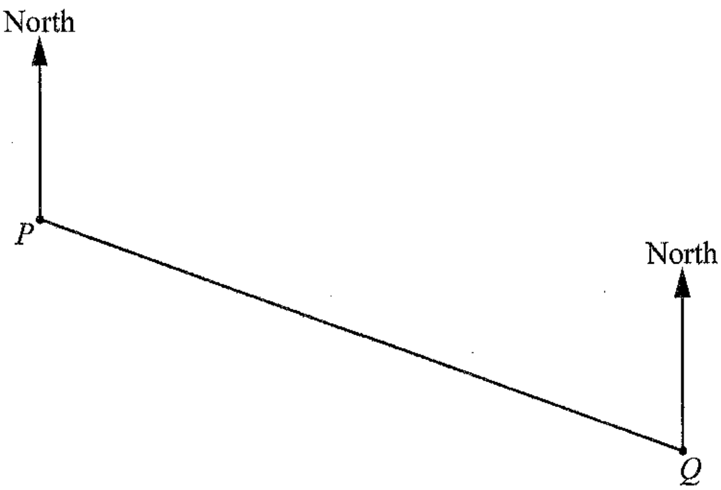
(b)



Shade **one** more small square so that the diagram has rotational symmetry of order 2. [1]

2 The scale drawing shows the positions of two villages, P and Q.

The scale is 1 cm represents 0.5 km.



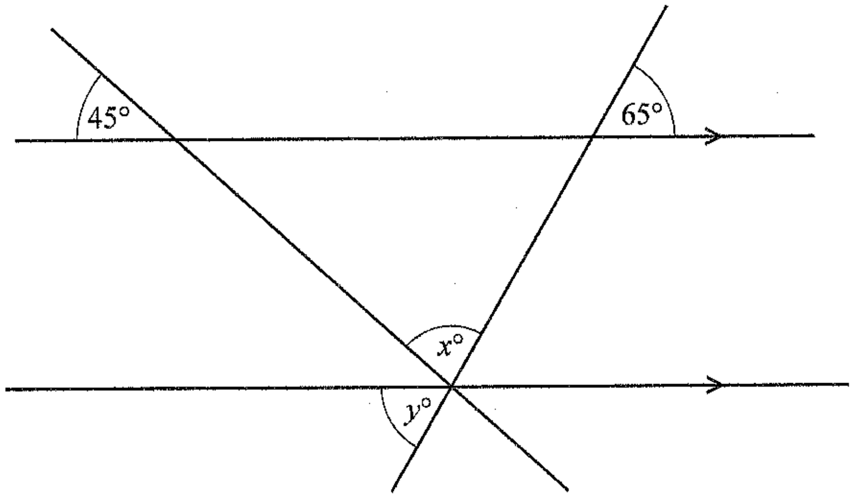
(a) Find the actual distance between village P and village Q.

.... km [2]

(b) Measure the bearing of village Q from village P.

.... [1]

3



NOT TO SCALE

The diagram shows two straight lines intersecting two parallel lines.

Find the value of x and the value of y.

$x =$ ....

$y =$ .... [3]

4

1	2	3	4	5	6	7

Samira picks one of these cards at random and replaces it.

(a) Find the probability that she picks an odd number.

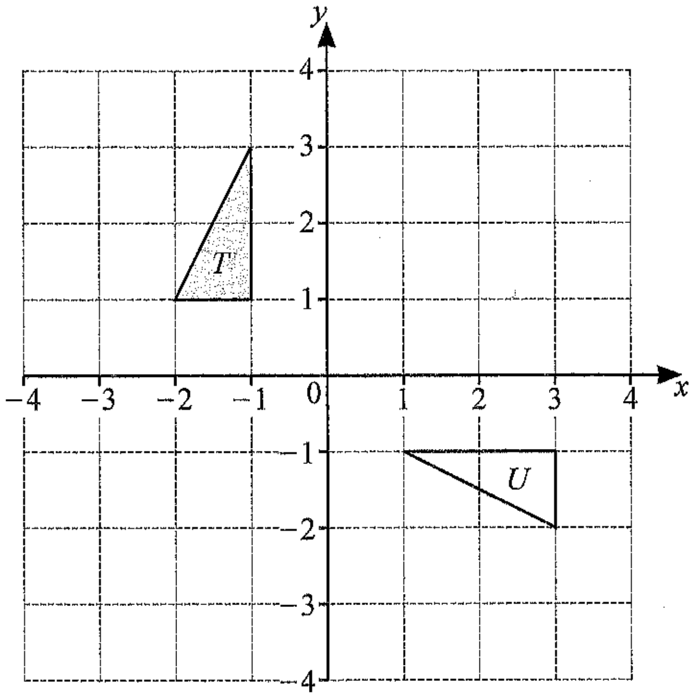
.... [1]

(b) Samira repeats this 35 times.

Calculate the number of times Samira is expected to pick an odd number.

.... [1]

5



(a) Translate triangle T by the vector $\begin{pmatrix} 0 \\ -2 \end{pmatrix}$. [1]

(b) Describe fully the **single** transformation that maps triangle T onto triangle U.

....

.... [3]

6 Solve.

(a) $8x + 7 = 39$

$x =$ .... [2]

(b) $2(5y - 1) = 24$

$y =$ .... [3]

7 These are the first 4 terms of a sequence.

11 8 5 2

(a) Find the next term of this sequence.

.... [1]

(b) Find the *n*th term of this sequence.

.... [2]

8 Find the highest common factor (HCF) of 36 and 54.

.... [2]

9 A is the point $(3, -1)$.

$\overrightarrow{AB} = \begin{pmatrix} 2 \\ -4 \end{pmatrix}$

(a) $\overrightarrow{AC} = 2\overrightarrow{AB}$

Find the coordinates of the point C.

(.................. , ...) [2]

(b) The length of AB is $k\sqrt{5}$.

Find the value of k.

$k =$ .... [2]

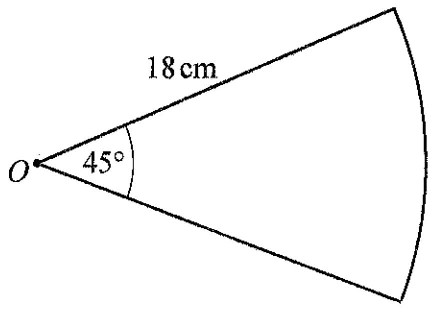
(c) P is a point on AB.

$AP : PB = 1 : 3$

Find the position vector of P.

$\begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [2]

10



NOT TO SCALE

The diagram shows a sector of a circle, centre O.
The length of the arc is $n\pi$ cm .

Find the value of n.

$n =$ .... [2]

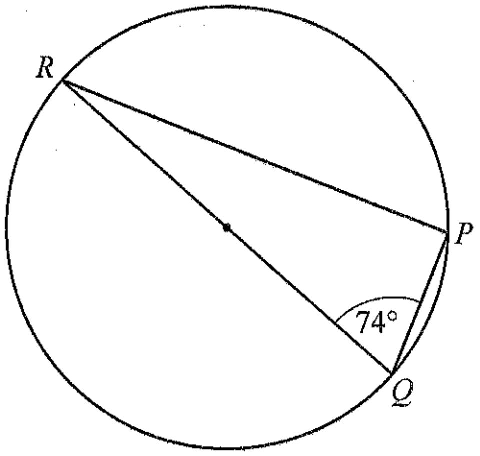
11 (a) Write 0.007 08 in standard form.

.... [1]

(b) Work out $(3.8 \times 10^{22}) + (3.8 \times 10^{23})$.
Give your answer in standard form.

.... [2]

12



NOT TO SCALE

P, *Q* and *R* lie on a circle.
QR is a diameter.

Find angle *PRQ*.
Give geometrical reasons for your answer.

Angle *PRQ* = ... because ....

.... [2]

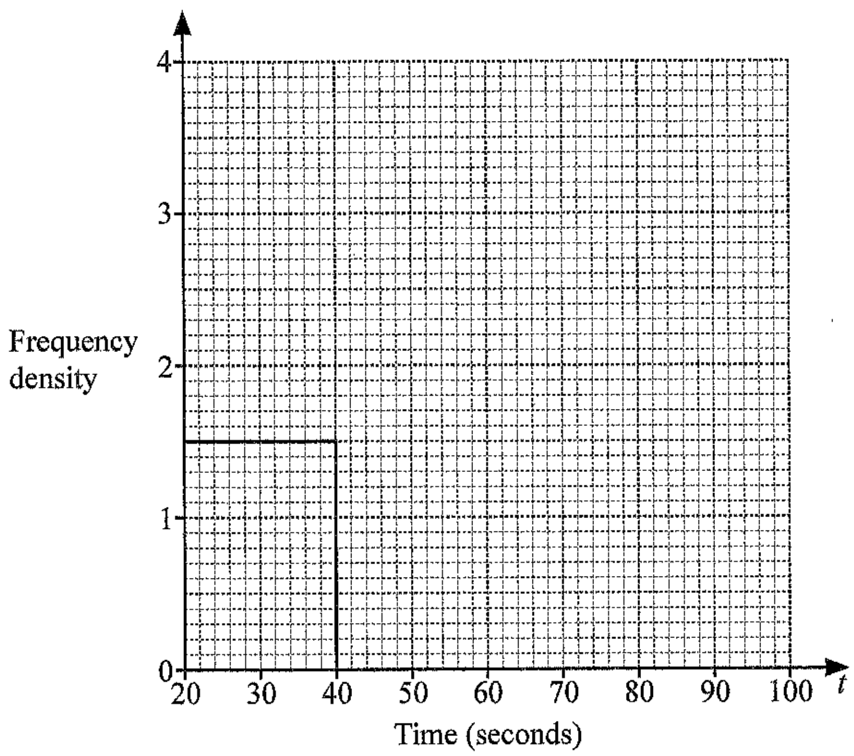
13 (a) 100 students solve a puzzle.
The table shows information about the time taken by each student to solve the puzzle.

Time (t seconds)	$20 < t \leqslant 40$	$40 < t \leqslant 60$	$60 < t \leqslant 100$
Frequency	30	40	30

(i) Work out an estimate of the mean.

.... s [4]

(ii) Complete the histogram to show the information in the table.

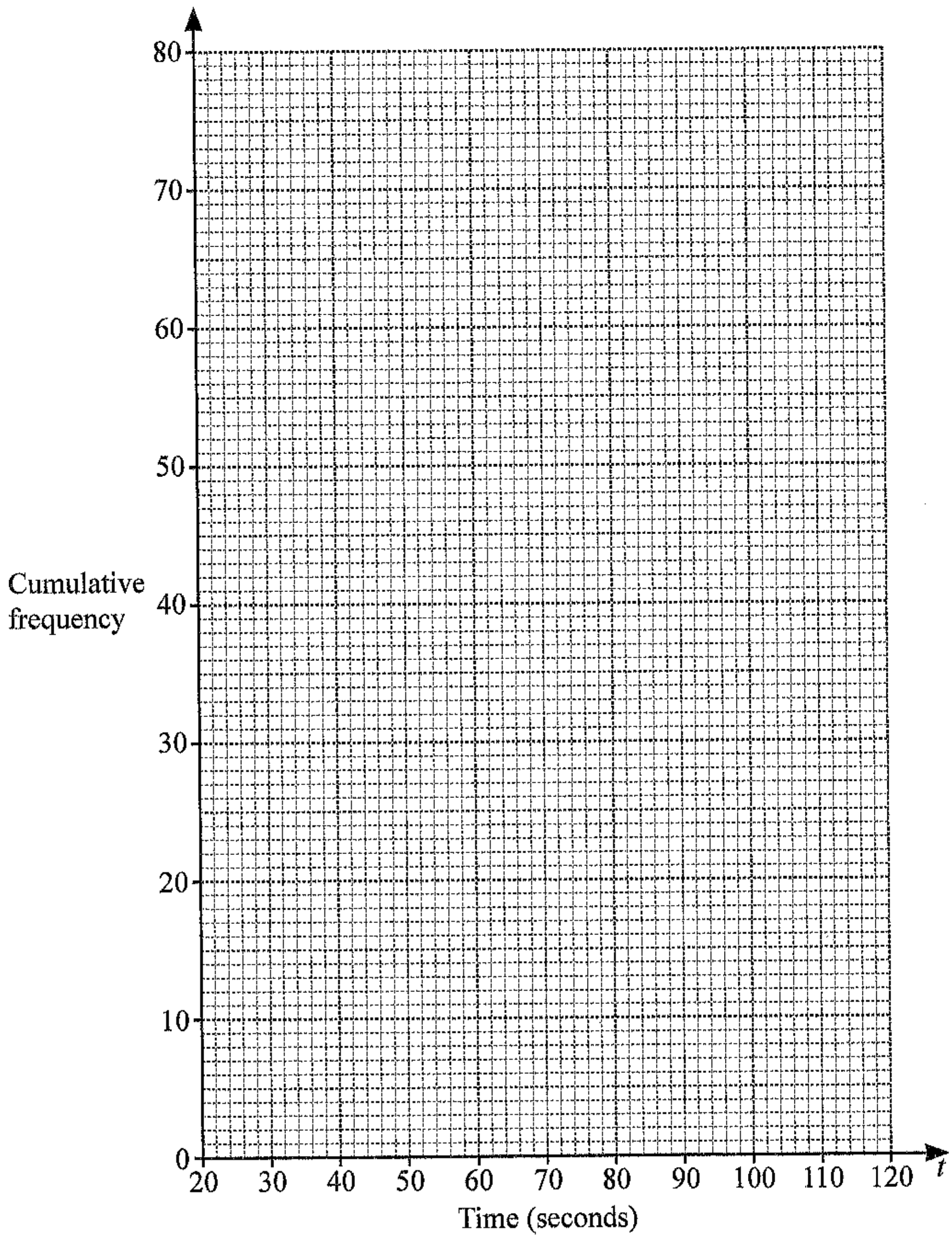


[2]

(b) 80 adults solve the same puzzle as the students.
The cumulative frequency table shows information about the time taken by each adult to solve the puzzle.

Time (t seconds)	$t \leqslant 20$	$t \leqslant 40$	$t \leqslant 60$	$t \leqslant 80$	$t \leqslant 100$	$t \leqslant 120$
Cumulative frequency	0	12	36	60	74	80

(i) On the grid, draw a cumulative frequency diagram.



[3]

(ii) Use your cumulative frequency diagram to find an estimate for

(a) the median

.... s [1]

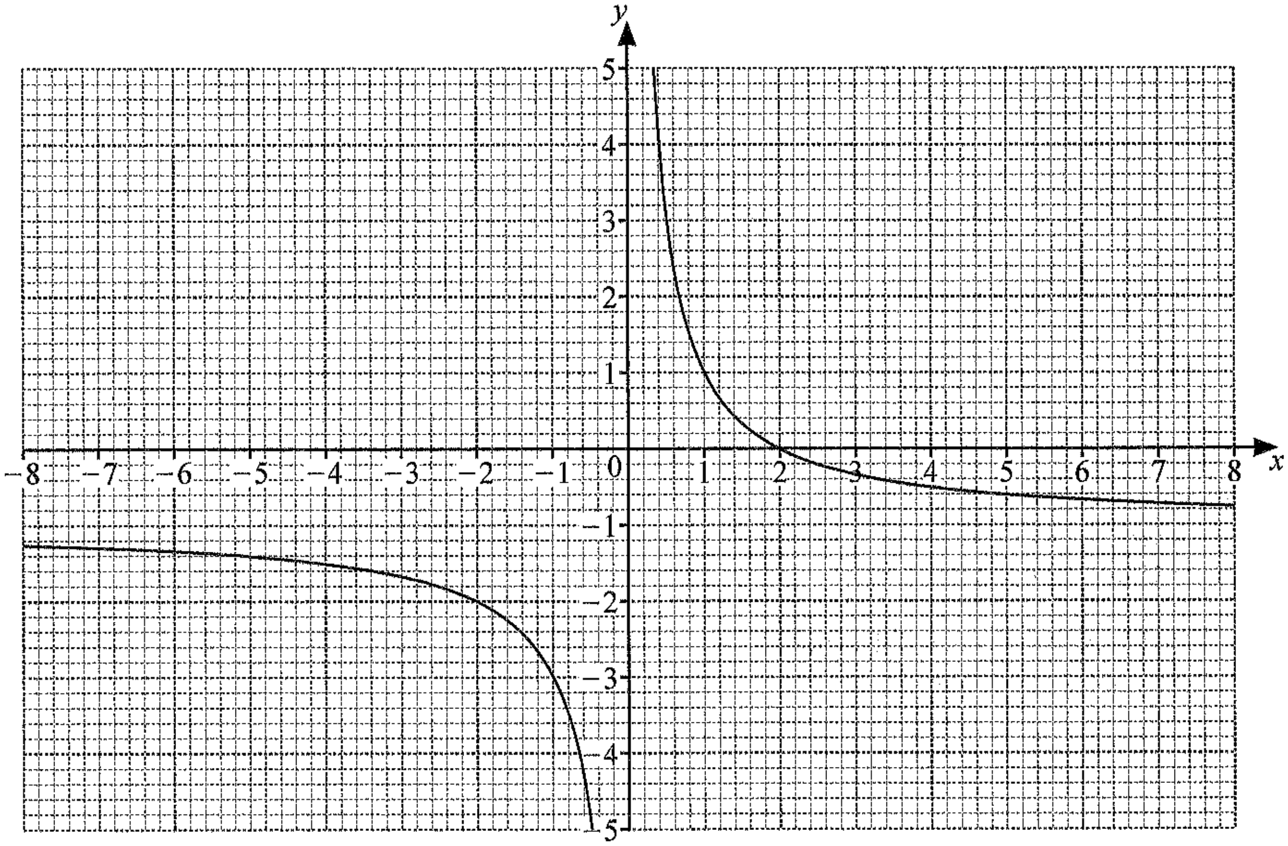
(b) the lower quartile.

.... s [1]

14 Write $0.2\dot{5}$ as a fraction.

.... [2]

15



The diagram shows the graph of $y = \frac{2}{x} - 1$.

(a) Write down the coordinates of the point where the graph crosses the x-axis.

(................. , ...) [1]

(b) Write down the equation of each asymptote.

....

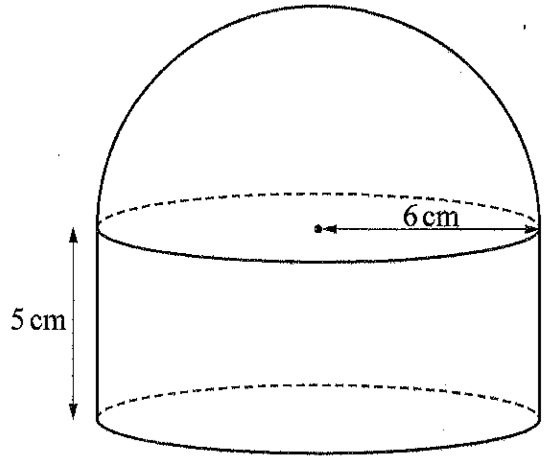
....

[2]

(c) By drawing a suitable straight line on the grid, solve $\frac{2}{x} - x - 1 = 0$.

$x =$ .... or $x =$ .... [3]

16



NOT TO SCALE

The diagram shows a solid made by joining a hemisphere to a cylinder.
The radius of both the hemisphere and the cylinder is 6 cm.
The height of the cylinder is 5 cm.

Find the **total** surface area of the solid.
Give your answer in terms of π.

.... cm^2 [4]

17 Find the value of

(a) $125^{\frac{2}{3}}$

.... [2]

(b) $4^{-\frac{5}{2}}$.

.... [2]

18 **(a)** $\dfrac{9}{\sqrt{3}}$

Rationalise the denominator.
Give your answer in its simplest form.

.... [2]

(b) $(5-\sqrt{2})(1+3\sqrt{2}) = c + k\sqrt{2}$

Find the value of c and the value of k.

$c =$ ....

$k =$ ....
[2]

19 Write as a single fraction in its simplest form.

(a) $\dfrac{5a}{6} \times \dfrac{3b}{a}$

.... [2]

(b) $\dfrac{p}{2} + \dfrac{3t}{4}$

.... [2]

(c) $\dfrac{2}{x-2} - \dfrac{3}{x+1}$

.... [3]

20 $y \propto \frac{1}{\sqrt{x}}$

(a) When $x = 9$, $y = 2$.

Find the value of y when $x = 36$.

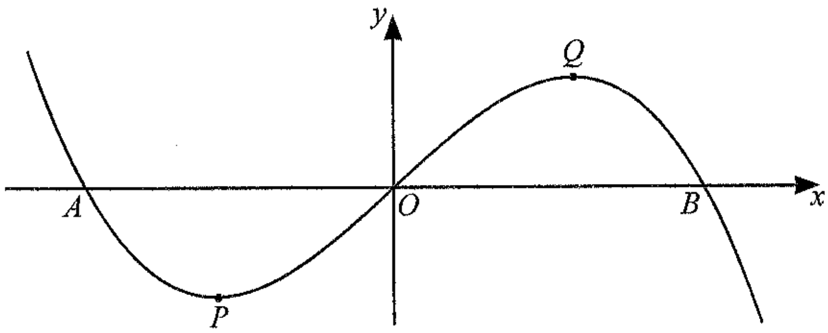
$y =$ .... [3]

(b) When x is increased by a factor of 4, the value of y changes by a factor of p.

Find the value of p.

$p =$ .... [1]

21



The diagram shows the graph of $y = 3x - x^3$.
The graph crosses the x-axis at A, at O and at B.
The turning points of the graph are at P and at Q.

(a) Find the x-coordinate of A and the x-coordinate of B.
Give your answers as exact values.

x-coordinate of A ....

x-coordinate of B .... [3]

(b) **(i)** Differentiate $3x - x^3$.

.... [2]

(ii) Find the coordinates of P and Q.

P (.................... , ...)

Q (.................... , ...) [4]

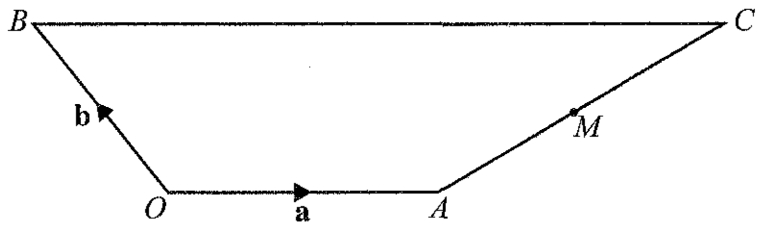
22 **(a)** Write down the exact value of $\tan 60°$.

.... [1]

(b) Solve $2\sin x - 1 = 0$ for $0° \leqslant x \leqslant 360°$.

$x =$ .... or $x =$ .... [3]

23



NOT TO SCALE

In the diagram, OA is parallel to BC.
$BC = 3OA$
M is the midpoint of AC.
The position vector of A is **a** and the position vector of B is **b**.

Find the position vector of M.
Give your answer in terms of **a** and **b**, in its simplest form.

.... [3]

24 The line $y = 7x + 3$ intersects the curve $y = x^2 + 5x - 12$ at the points A and B.

Find the coordinates of A and B.

A (.................... , ...)

B (.................... , ...)

[5]

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